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NOTES ON THE RANGE AND DISTRIBUTION OF  
*RETICULARIA LAEVIS*<sup>1</sup>

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Progress in stratigraphic paleontology in recent years has been largely along the line of increasing our knowledge of the range and distribution of faunas and of the individual species composing them. The important bearing of this class of knowledge upon questions concerning the evolution and dispersal of faunas is evident. Its interest to the general geologist lies chiefly in the fact that the accuracy with which fossils can be used in correlation is in direct proportion to the completeness of our knowledge of their range.

The rapid growth of stratigraphic paleontology during the last two decades, as compared with preceding decades, is illustrated in the history of the development of our knowledge concerning the distribution and range of *Reticularia laevis*, a well-known Devonian brachiopod. For nearly forty years after it had been described practically nothing was added to the information concerning its distribution and range given by Hall at the time of its description. In 1881 Williams wrote: "Only a few localities are known in which this large fossil is found, and, so far as I can learn, none outside of the state" (New York).<sup>2</sup> Its vertical range was then supposed to be limited to about 3 feet<sup>3</sup> of strata. During the twenty years which have elapsed since this was written the distribution of the species has been extended from a small area in central New York across two other states, and the known vertical range has grown from 3 feet to more than a thousand.

*Reticularia laevis* first appears in the New York section in the lower part of the Nunda or Portage formation. It belongs normally to the brachiopod fauna of the Ithaca facies of the Nunda or Portage. It has never been found associated with the Naples facies which

<sup>1</sup> Published by permission of the director of the U. S. Geological Survey.

<sup>2</sup> *Annals of the New York Academy of Science*, Vol. II (1881), p. 140.

<sup>3</sup> *Ibid.*, p. 141.

flourished alongside and to the westward of the Ithaca fauna. At the best-known locality of its occurrence *R. laevis* is found abundantly through 3 feet of strata, above and below which it is unknown for a considerable interval. At this locality, which is at the foot of Ithaca Falls, at Ithaca, N. Y., the associated fauna, as determined by the writer,<sup>1</sup> is as follows:

Lingula ligea ? r.	Modiomorpha subalata
Crania sp. r.	Grammysia subarcuata r.
Chonetes lepida a.	Glyptocardia speciosa r.
Chonetes scitula r.	Nucula diffidens r.
Leiorhynchus mesacostalis	Mytilarca chemungensis ? r.
Cyrtina hamiltonensis r.	Leda diversa
Spirifer laevis a.	Pleurotomaria capillaria r.
Lunulicardium fragile a.	Orthoceras pecator r.
Paleoneilo filosa a.	Tornoceras discoideum c.
Ariculopecten rugaestriatus ?	Taxacrinus ithacensis
Aviculopecten lautus var. ithacensis r.	

This zone of *Sp. laevis* is about 250 feet above the Genesee shale and near the top of the Sherburne sandstone. It lies below the typical Ithaca fauna at a horizon where more or less intermingling of the Naples and Ithaca faunas occurred. The Ithaca element of the fauna is seen in the brachiopod species, while the western fauna is represented by such forms as *Lunulicardium fragile* and *Glyptocardia speciosa*.

This horizon, from which the species was described by James Hall in 1843,<sup>2</sup> remained the only one known for it till forty years later, when Williams found it near the top of the Ithaca fauna,<sup>3</sup> at a single locality in the Fall Creek section about 400 feet higher.

While studying the Ithaca fauna in 1896 the writer found a third zone of *Reticularia laevis* at Ithaca in the McKinneys Station section, which is 120 feet below the zone at the foot of Ithaca Falls.<sup>4</sup>

The discovery of this third zone extended the known vertical range to about 520 feet. The upper zone of the species at or near the top of the Ithaca group had not been relocated since its discovery

<sup>1</sup> *Bulletins of American Paleontology*, No. 6 (1896), p. 17.

<sup>2</sup> *Geology of New York, Report of Fourth District* (1843), p. 245, fig.

<sup>3</sup> *Bulletin No. 3*, U. S. Geological Survey, 1884, p. 20.

<sup>4</sup> *Bulletins of American Paleontology*, No. 6 (1896), p. 28.

by Williams in the early eighties, until the areal survey of the Watkins's Glen quadrangle was undertaken. During this survey the writer found it at several localities near the top of the Ithaca group. In this zone *Reticularia laevis* is associated with typical Ithaca species, such as *Leptostrophia mucronatus*, *Spirifer mucronatus* var. *posterus*, and *Pugnax pugnus*. This zone near the top of the Ithaca member lies about 650 feet above the Genesee shale. No higher occurrence of the species within the Nunda formation is known. The few fossils which occur in the upper half of the Nunda sections near Ithaca belong to the Naples or western facies, a facies with which *Reticularia laevis* has nowhere been found associated. In the Brookton section, near Ithaca, the writer found a fourth zone of this species entirely above the Nunda, and very near the base of the Chemung formation. Here *R. laevis* occurs in abundance in the same bed with *Spirifer disjunctus*, which is also abundant. This, the highest known horizon of *R. laevis*, is not more than 50 feet above the base of the Chemung, and lies about 1,300 feet above the Genesee shale.

We are indebted to J. M. Clarke and D. D. Luther for the recorded observations on the range of the species to the east and west of Ithaca. Hall, in his original descriptions, reported the species to occur<sup>1</sup> on the "shore of Seneca Lake," but gave no definite locality, and the species was not found by subsequent workers in the Seneca basin until a comparatively recent date. In 1885 Clarke wrote: "I do not know of its occurrence<sup>2</sup> west of Tompkins County." In Clarke's first report on the Portage faunas of the Seneca basin *R. laevis* does not appear. In the recent paper by Clarke and Luther it is recorded from a single locality near Montour Falls. In this region Mr. V. H. Barnett and the writer found this species at the locality cited by Clarke and Luther, and also in the Watkins and Havana Glen sections. It occurs in the Watkins Glen section about 185 feet above the level of Seneca Lake. These occurrences in the Seneca basin are within the horizon occupied by the Ithaca fauna in the section. The Naples facies has largely supplanted the Ithaca facies in the Seneca section, greatly reducing the thickness of the portion of the column occupied by it.

<sup>1</sup> Geology of New York, *Report of Fourth District* (1843), p. 245.

<sup>2</sup> *Bulletin No. 16*, U. S. Geological Survey, 1885, p. 66.

Eastward of Ithaca, *R. laevis* has not been found beyond the valley of the Chenango River. The easternmost localities known in the New York area are the McGrawville section 4 miles east of Courtland, East Homer,<sup>1</sup> and the Cowles Hill section at Greene.<sup>2</sup> In the region intervening between the Cayuga section and the Chenango valley, *R. laevis* has been found at a number of localities during the survey of the quadrangles in this district. Its occurrence in this area has also been recorded by Clarke and Luther.<sup>3</sup> East of Ithaca the Ithaca brachiopod fauna extends upwards, filling the upper part of the Nunda column, which was occupied by the Naples facies to the westward before the Tiognioga River is reached. All of the occurrences of *R. laevis* in this region are associated with the Ithaca fauna.

The occurrence at Greene represents the highest horizon attained by the species in this eastern region. It occurs here above the Oneonta sandstone in what Clarke calls a "proemial Chemung fauna,"<sup>4</sup> and "not less than 1,200 feet above its first appearance"<sup>5</sup> at Ithaca, according to this author. In this section *R. laevis* occurs with *Leptostrophia mucronata*, an Ithaca species, and no Chemung fossils are reported as occurring with it, so that Clarke's conclusion as to its post-Nunda age is based presumably upon stratigraphic grounds. The discovery of *R. laevis* and *Sp. disjunctus* in association, by the writer, as already noted, however, leaves no question as to the fact that *R. laevis* appears in the New York section as late as the lower part of the Chemung.

In Pennsylvania *R. laevis* has been found at only two localities. These are on the Susquehanna River, in sections studied by the writer at Hollowing Run and Catawissa. In both of these sections the species is found associated with the fauna of the Ithaca facies. In the Catawissa section *R. laevis* occurs at two horizons. The lower faunule in which it occurs contains:

<i>Cystodictya meeki</i> (a)	<i>Nucula</i> sp. (r)
<i>Cyrtina hamiltonensis</i> (r)	<i>Palaeoneilo plana</i> (c)
<i>Spirifer mucronatus</i> var. <i>posterus</i> (r)	<i>Leda diversa</i> (r)
<i>Sanguinolites</i> (?) sp. (r)	<i>Actinopteria perstrialis</i> (a)

<sup>1</sup> *Fifteenth Annual Report*, New York State Geologist, 1895, p. 72.

<sup>2</sup> *Ibid.*, pp. 37-39.

<sup>3</sup> *Bulletin No. 82*, New York State Museum, p. 64.

<sup>4</sup> *Sixteenth Annual Report*, New York State Geologist, 1896, p. 36.

<sup>5</sup> *Fifteenth Annual Report*, New York State Geologist, 1895, p. 39.

This lower zone lies 480 feet, and the second zone 1,380 feet, above the Genesee shale, so that the species in this section has a known range of 900 feet.

In the Hollowing Run section, which lies about 25 miles southwest of the Catawissa section, *R. laevis* was found at only one horizon. Its occurrence in this section is not far from the horizon of the lower *R. laevis* zone in the Catawissa section.

In Pennsylvania the Naples and Ithaca facies of the Nunda hold the same geographic relation to each other that they do in New York, the first occupying the westerly, and the second the easterly, sections of the Nunda. The Altoona section, which has been studied by Mr. Charles Butts and the writer, lies well to the west of the Susquehanna sections, and within the area of the dominance of the Naples facies. Neither *R. laevis* nor any other faunal element of the Ithaca facies was found in it. The limitation of the known occurrence of *R. laevis* to two sections is doubtless due to the fact that these are the only sections which have been carefully studied within the area where this species may be expected to occur. It is safe to predict that *R. laevis* will be found in many of the more easterly sections of the Nunda from the New York to the Maryland line, and that it will not generally be found in the westerly sections.

A collection of fossils from West Virginia recently submitted to the writer by Mr. George Stose for determination contains two specimens of *R. laevis*.<sup>1</sup> They occur in association with a brachiopod fauna representing the Ithaca facies of the Nunda. They were collected on Yellow Spring Run, 3 miles southeast of Berkley Springs, W. Va. Mr. Stose's collection represents the most southerly occurrence of the species which has been discovered. The determination of these West Virginia specimens gives the species a known distribution in a northerly and southerly direction of about 225 miles. In New York its distribution in an easterly and westerly direction appears to be limited to about 60 miles. In the southern part of its range we have as yet no data for determining its distribution in this

<sup>1</sup> The Hancock quadrangle in which this species was found is being surveyed co-operatively by the Maryland and United States Geological Surveys, and the writer is able to publish these data through the courtesy of Professor W. B. Clarke, director of the Maryland Geological Survey.

direction, but it may be stated that it will probably be found to coincide with the distribution of the Ithaca facies of the Nunda.

The maximum range of the species, as shown by the New York sections, extends from near the base of the Nunda into the lower Chemung. It has, however, been found at a post-Nunda horizon in only two of the many sections in which it is known.